has, it seems to me, an important bearing upon a question which has been raised by Marignac, Schutzenberger, and others, and which has again been raised by Mr. Crookes in the address I have already referred to. Mr. Crookes thinks that it may well be questioned whether there is an absolute uniformity in the mass of every ultimate atom of the same chemical element, and that it is probable that our atomic weights merely represent a mean value, around which the actual atomic weights of the atoms vary within certain narrow limits, or in other words that the mean mass is a statistical constant of great stability. The facts of diffusion would seem to lend no support to such a supposition.

Graham was still living when Loschmidt published what Prof. Exner calls his "epoch-making paper" on the "Size of the Air Molecule." Although the numerical estimate which Loschmidt deduced from the mean free path of the molecules and their volume has now only an historical interest, it has exercised a profound influence on the development of molecular physics in demonstrating that in dealing with molecules we are dealing with masses of finite dimensions, and further that these dimensions are by no means immeasurably small. The very manner in which Loschmidt stated his conclusions was well calculated to rivet attention. He showed that these magnitudes, small as they are, are yet comparable with those which can be reached by mechanical skill. The German optician Nobert has ruled lines on a glass plate so close together that it requires the most perfect microscopes to observe the intervals between them; he has drawn, for example, as many as 4000 lines in the breadth of a millimetre, that is about 112,000 lines to the inch. Now, if we assume, with Maxwell, that a cube whose side is 1/4000 of a millimetre is the smallest volume observable at present, it would follow that such a cube would contain from 60 to 100 millions of molecules of oxygen or nitrogen, and if we further assume that the molecules of organised bodies contain on an average 50 "elementary" atoms it further follows that the smallest organised particle visible under the microscope contains about two million molecules of organic matter. And as at least half of every living organism is made up of water, we arrive at the conclusion that the smallest living being visible under the microscope does not contain more than about a million organic molecules. I could have wished, had time permitted, to have dwelt a little upon the intensely interesting questions which such a conclusion at once raises. In the article "Atom" in the present edition of the "Encyclopædia Britannica," from which I have quoted, you will find Clerk Maxwell points out its relation to physiological theories, and especially to the doctrine of Pangenesis. Molecular science, says Maxwell, "forbids the physiologist from imagining that structural details of infinitely small dimensions can furnish an explanation of the infinite variety which exists in the properties and functions of the most minute organisms."

In the year following Graham's death Sir William Thomson still further developed the modes of molecular measurement, and from a variety of considerations based upon the kinetic theory of a gas, upon the thickness of the films of soap-bubbles, and from the electrical contact between copper and zinc, he arrived at estimates which, although sensibly different from that of Loschmidt, are still commensurable with it. In a subsequent lecture to the Royal Institution, given about four years ago, he extended the lines of his argument and arrived at the conclusion that in any ordinary liquid, transparent solid, or seemingly opaque solid, the mean distance between the centres of contiguous molecules is less than 1/5,000,000 and greater than 1/1,000,000,000 of a centimetre. And in order to give us some conception of the degree of coarse-grainedness implied by this conclusion he asks us to imagine a globe of water or glass as large as a football to be magnified up to the size of the earth, each constituent molecule being magnified in the same proportion. The magnified structure would be more coarse-grained than a heap of small shot, but probably less coarse-grained than a heap of footballs (NATURE, vol. xxviii. p. 278).

Here I think we may leave the subject, at all events for to-night. I am painfully conscious that I have left unsaid much that ought to have been said, and possibly said some things that might well have been left unsaid. But my main purpose will have been served if I have succeeded in indicating to you Graham's position as an atomist, and in showing you how his ideas respecting the constitution of matter have germinated, and, like the seed which fell upon good ground, have borne fruit an hundredfold.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 17.—"On the Total Solar Eclipse of August 29, 1886 (Preliminary Account)." By Arthur Schuster, F.R.S.

The instrument intrusted to me by the Eclipse Expedition was similar to that employed in Egypt during the eclipse of 1882. The equatorial stand carried three cameras, one of which was intended for direct photographs of the corona, while the two others were attached to spectroscopes.

Photographs of the Corona.—The lens had an aperture of 4 inches, and a focal length of 5 feet 3 inches; giving images of the moon having a diameter of about 0·6 of an inch.

During the first minute of totality the corona was covered by a cloud, which was, however, sufficiently transparent to allow the brightest parts of the corona to show on the ten photographs exposed during that time.

During the remaining time, that is to say, during about two minutes and a half, the sky was clear, but there were clouds in the neighbourhood of the sun.

The time of exposing the photographs which had been fixed beforehand had to be altered in consequence of the uncertainty of the weather, and for this reason I can only give the actual times of exposures very approximately and from memory. One photograph on sensitive paper shows only little detail; but three photographs on glass were obtained, which, as regards definition, I believe to be equal to those obtained in Egypt. The approximate exposures were 15 to 20 seconds, 10 to 15 seconds, and about 5 seconds.

With the view of possibly increasing the amount of detail which it has hitherto been possible to obtain on the photographs of the corona, I have, on this occasion, given considerable attention to the different adjustments, so as to fix the cause which at present limits the definition, and I have come to the conclusion that, if we are to obtain better photographs of the corona, we can only hope to do so by means of a better mechanical arrangement for moving the camera.

Photographs of the spectrum of the corona were obtained by means of two instruments, one being identical with that employed at Caroline Island in 1883. This spectroscope has two prisms of 62° refracting angle, the theoretical resolving power being about 10 in the yellow. (The unit of resolving power is the resolving power which allows of the separation of two lines differing by the thousandth part of their own wave-length.) The slit of this spectroscope was placed so that it was tangential to the image of the sun formed by the condensing lens. One plate was exposed during the whole of totality. The results are good; a number of lines belonging to the prominences and to the corona are very distinct and can be measured with fair accuracy. The difficulty of measurement lies in the multitude of lines. I have measured at present between forty and fifty distinct corona lines between the solar lines F and H, and a number remain unmeasured.

A comparison between the photographs of 1882 and 1886 shows that, although the lines seem to be in the same position, their relative intensity has greatly altered. The strongest corona line during the last eclipse had a wave-length of about 4232; it is slightly but distinctly less refrangible than the strong calcium line at 4226.

The second spectroscope had its slit placed so as to take a radial section of the corona. It had one large prism giving a theoretical resolving power of 11·4; slightly larger therefore than the two-prism spectroscope.

The film was one prepared by Capt. Abney so as to be more sensitive in the green than the ordinary plates.

The photograph obtained is faint, but I believe will ultimately give good results.

A good drawing of the corona was obtained by Capt. Maling at the station occupied by Capt. Darwin and myself.

The plates were prepared by Capt. Abney, whose valuable help I have had in the whole of the preliminary arrangements.

March 24.—"Preliminary Note on the 'Radio-Micrometer,' a New Instrument for measuring the most Feeble Radiation."[1] By C. Vernon Boys.

The author considered that, if the thermo-electric power of a junction were properly utilised, a more sensitive instrument would be made than the bolometer, which depends on the change of resistance of a conducting filament with temperature. After showing the defects of the ordinary thermopile, he explained the construction of his instrument. A circuit is made of one turn of 1 square centimetre, of which three sides are thin copper wire, and the fourth is a compound bar of antimony and bismuth, each piece being $5 \times 5 \times \frac{1}{6}$ mm., soldered edge to edge. This circuit is supported by a thin rod, to which is fastened a mirror, and the whole is hung by a torsion fibre, so that the circuit is in the field produced by a powerful magnet with suitable pole pieces.

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[1] I have learnt that an instrument essentially the same in principle as the radio-micrometer was made and shown by M. D'Arsonval to the French Physical Society; it is hardly necessary to say that I was not aware of this before reading the paper.—C. V. B.

When radiant energy falls on the centre of the bar, the circuit is deflected, and the amount of the deflection measures the energy. The instrument supplies the most delicate means of detecting radiant heat yet made. For instance, the particular instrument made by the author—having proportions which he now knows to be not the best, and with the keeper on the magnet, so that the field was one of 100 units only—was capable of showing the heat which would be cast on a halfpenny by a candle-flame at a distance of 1168 feet, and as the sensibility is proportional to the strength of the field, it would be fully ten times as sensitive with the keeper off.

By calculation it may be shown that an instrument made with certain given proportions, which are easily obtainable, would be capable of showing a change of temperature of the junction of 1/100,000,000 of a degree of heat.

The author also showed a motor consisting of a cross of metal, the centre being antimony and the arms bismuth, to the ends of which are soldered four copper wires, whose free ends are joined by a ring of copper which rotates rapidly when the spark at the end of a blown-out match is held near it.

If the spark is held on the right-hand side of the north pole, the motor will start itself oscillating through angles which increase until it at last begins to revolve, which it will do indifferently in either direction. If the spark is held on the left-hand side, the motor at once stops.

This is interesting in that it is an electro-magnetic motor which goes, having neither sliding nor liquid contacts.

The author promises, shortly, a complete paper in which the best proportions for the various parts are given, and to show an instrument in which these proportions are employed.

Geological Society, March 23.—Prof. J. W. Judd, F.R.S., President, in the chair.—The following communications were read:—Notes on the structure and relations of some of the older rocks of Brittany, by Prof. T. G. Bonney, F.R.S. These notes are the results of a visit to some of the more interesting geological sections in Brittany, in the autumn of last year. The author is greatly indebted for information to the Rev. E. Hill, who took part in the summer excursion of the Société Géologique de France, and to Dr. Charles Barrois, who has for long been engaged in investigating the geology of Brittany. (1) The author briefly noticed the glaucophane-amphibolites and the associated schists of the Ile de Groix, which have been already admirably described by Dr. C. Barrois. (2) The next part of the paper treated of sections in the district about Quimperlé. (3) In this part of the paper were noticed the crystalline rocks of Roscoff, and (more briefly) the Palæozoic strata about Morlaix, with the mineral and structural modifications due to pressure and to the action of intrusive igneous rocks. The author pointed out that, in the latter case, the results either of pressure-metamorphism or of contact-metamorphism differ much from the crystalline schists, which, both in Brittany and elsewhere, are regarded as of Archæan age; and that here in the north at Roscoff, we have a series of banded gneisses, less modified by subsequent pressure than in the south, the structures of which are very difficult to explain on any theory of a "rolling out" of a complicated association of igneous rocks, but which are such as would naturally result from some kind of stratification of the original constituents. The result of the author's work is to strengthen the opinion which he has already expressed, that while the structures of some foliated rocks may be regarded as primarily due to pressure operating on suitable materials, the structure of others seems opposed to this explanation. At any rate the latter rocks appear to have assumed a crystalline condition with a semblance of stratification in Pre-Cambrian times; so that, whatever may be their genesis, they are rightly called Archæan gneisses and schists.—The rocks of Sark, Herm, and Jethou, by Rev. E. Hill.—In opening the discussion which took place after the reading of these papers, the President remarked on the value attaching to Prof. Barrois's work in Brittany, and on the interest of the observations made on the country by Prof. Bonney. The conclusions as to the Archæan age of the lower gneissose rocks would probably be generally accepted; but a question which must still be regarded as an open one was, whether foliation ever corresponded with original bedding. The supposed instances of unconformity and current-bedding depended on the assumption that such was the case. Mr. Becker, Mr. Rutley, and Dr. Hicks, also took part in the discussion.—Quartzite boulders and grooves in the Roger Mine at Dukinfield, by Mr. James Radcliffe. The statements made in this paper were discussed by Mr. W. W. Smyth, Prof. Boyd Dawkins, Mr. Blanford, and Prof. Bonney.

Royal Microscopical Society, February 9.—Annual Meeting.—Dr. Dallinger was re-elected President for the fourth time. We have already printed the remarks made by Dr. Dallinger in his annual address on the value of the new apochromatic lenses. Having dealt with this subject, he proceeded to record the results of experiments as to the changes of temperature to which the lower forms of organisms can be adapted by slow modifications. For nearly seven years continuous experiments and observations were made, with the result that several organisms had gradually become adapted to live and thrive under a high temperature. Commencing at the normal temperature of 60° F., the first four months were occupied in raising the temperature 10° without altering the life-history. When the temperature of 73° was reached, an adverse influence appears to be exerted on the vitality and productiveness of the organisms. The heat being left constant for two months, they regained their full vigour, and by very gradual stages of increase 78° was reached in five months more. Again a long pause was necessary, and during the period of adaptation a marked development of vacuoles was noticed, which again disappeared when it was possible to raise the temperature farther. The farther history of the experiments presented practically the same features—long pauses, vacuolation, slow advance—until at last the high temperature of 158° F. was reached, when the research was accidentally terminated. It is because it is so difficult to observe the effects of changes through a sufficient number of generations of larger animals that results obtained on the simpler forms are so valuable. Darwin distinctly insisted on the slowness of the process of adaptation. The organisms examined by Dr. Dallinger are incessantly multiplying by dividing, the longest interval being four minutes: half a million generations must therefore have been observed, giving the "countless generations" required. At the end of the series the organisms were found to be fully adapted to a change in the essential condition of life, sufficient to produce death originally.

March 9.—Mr. W. T. Suffolk, Vice-President, in the chair.—Mr. E. C. Bousfield exhibited photomicrographs of *Amphipleura pellucida*, to show what may be expected from the employment of Prof. Abbe's new lenses. The objective employed was a very fine 1/8 apochromatic homogeneous-immersion 1·4 N.A. He also exhibited photomicrographs of salicine crystals as viewed by polarised light, and the colours were purposely selected to test as severely as possible the capacity of the plate used—a Dixon's orthochromatic.—Dr. Crookshank exhibited two photomicrographs of flagellated Protozoa of the blood. These were taken with Zeiss's 1/18 homogeneous-immersion from a preparation stained with magenta. The amplification (1750) was obtained by enlargement from the original negatives. They illustrated the employment of the Eastman bromide paper, and the value of photomicrographs for teaching purposes. The flagella and the delicate longitudinal membrane were clearly demonstrated.—Mr. W. Watson exhibited and described the Watson-Draper microscope, which he had made on the designs of Mr. E. T. Draper. The microscope is an elaboration of the Watson-Crossley form, and the idea of the designer is "that when the object is on the stage, either it may be made to rotate in any direction, horizontal or vertical, round a fixed beam of light without the light ever leaving the object, or the stage may be kept fixed while the light is revolving round it in any direction, horizontal or vertical, always however remaining upon the object."—Mr. J. Mayall, Jun., described the Nelson model microscope exhibited by Mr. C. Baker.—Two papers were read: by Mr. G. Massee, on the differentiation of tissues in fungi; and by Drs. H. J. Johnston-Lavis and G. C. J. Vosmaer, on cutting sections of sponges and other similar structures with soft and hard tissues, and specimens of sections of sponges were exhibited of exceptionally large size.—An arrangement by Mr. W. A. Haswell was exhibited for mounting series-sections to the number of thousands on one disk for consecutive examination.

EDINBURGH

Royal Society, March 7.—Sir W. Thomson, President, in the chair —The President read a third communication on the equilibrium of a gas under its own gravitation alone. He finds that a large part of his former conclusions has been anticipated by Mr. Homer Lane.—Sir W. Thomson also communicated a paper on Laplace's nebular theory, considered in relation to thermo-dynamics. In the light of thermo-dynamical principles, Laplace's theory is seen to be not a mere plausible hypothesis but a statement of actual fact.—Dr. Thomas Muir read part of a paper on the history of the theory of determinants, treating of authors from Hindenburg (1784) to Reiss (1829).—Dr. Muir also communicated papers on a class of alternating functions, and on the quotient of a simple alternant by the difference-product of the variables.—Mr. J. Aitken read notes on solar radiation, and on hoar-frost.—An account of researches on the influence of certain rays of the solar spectrum on root-absorption and the growth of plants, by Dr. A. B. Griffiths, was submitted by Prof. Crum Brown.

March 21.—Lord Maclaren, Vice-President, in the chair.—Prof. Nicholson read a communication on variations in the value of the monetary standard.—Mr. J. Y. Buchanan read a paper on ice and brine, and another on the distribution of temperature in the Antarctic Ocean.

PARIS

Academy of Sciences, March 28.—M. Janssen, President, in the chair.—On the calorimetric bomb and measurement of heats of combustion, by MM. Berthelot and Recoura. The improvements are described which have been made in this apparatus, originally invented by MM. Berthelot and Vieille for the purpose of measuring the heats of combustion of organic compounds. The method, already applied to slightly volatile substances and gases, may now be easily extended to all volatile compounds, and is consequently a universal method.—On aërial vortices, by M. D. Colladon. The author announces that he has succeeded in carrying out on a small scale the experiment alluded to in his note of March 3, demonstrating that in a fluid there may be set up a vortex with vertical axis and ascending movement.—On the variation of solubility of substances according to the amount of heat liberated, by MM. G. Chancel and F. Parmentier. The experiments here described show that to a solubility increasing with the temperature there does not necessarily correspond an absorption of heat, so that one of the relations established by M. Le Chatelier must be rejected.—Extracts from various reports of the local engineering service on the effects caused by the earthquake of February 23, communicated by the Minister of War. Among the results recorded at Nice were the fissures produced in the Barbonnet Hill running along its entire elevation almost vertically to the magnetic north pole.—The same earthquake as observed at Moncalieri, by M. F. Denza. The diagram is given which was traced by the seismograph (Cecchi system) at the Moncalieri Observatory.—On the latent heats of vaporisation of some very volatile substances, by M. James Chappuis. The process here applied to the study of the chloride of methyl, sulphurous acid, and cyanogen is based on the employment of the Bunsen calorimeter, by means of which may be determined with considerable accuracy the latent heats of ebullition at 0° under the maximum tension corresponding to the melting of snow The mean results obtained were for the chloride of methyl, 96·9; sulphuric acid, 91·7; cyanogen, 103·7.—On the determination of the coefficient of self-induction, by MM. P. Ledeboer and G. Maneuvrier. The method here employed to determine this quantity consists of a new adaptation of those of Maxwell and Lord Rayleigh to a particular case in which the coefficient is too weak to produce an appreciable shock in the galvanometer. It possesses the advantage of dispensing with the use of the ballistic galvanometer, and of rendering possible the employment of an ordinary galvanometer with mirror.—A study of the alkaline vanadates, by M. A. Ditte. With a view to determining the place that vanadium should occupy in a classification of simple elements, the author here begins a study of the little-known metallic vanadates, taking first the vanadates of potassa: (1) VO_5,KO; (2) $2VO_5,KO$; (3) $3VO_5,2KO$, &c.—Double phosphate and arseniate of strontian and soda, by M. H. Joly.—On some ammoniacal combinations of the chloride of cadmium, by M. G. André. This subject, already treated by Croft and Hauer, is here resumed chiefly from the stand-point of the comparisons that it suggests between the three metals zinc, copper, and cadmium, whose oxides are soluble in ammonia.—Action of nitric acid on the solubility of the alkaline nitrates, by M. R. Engel.—On the metallic propionates, by M. Adolph Renard. Among the propionates here studied are those of aluminium, barium, calcium, cadmium, chromium, cobalt, copper, lithium, magnesium, manganese, lead, potassium, sodium, strontium, and zinc.—Age of the upheaval of the Montagne Noire, French Pyrenees, by M. A. Caraven-Cachin. This upheaval is regarded as comparatively recent, being referred to the beginning of the Upper Eocene. It is more recent than the profoundly dislocated Lutetian and Bartonian beds, but older than the Ligurian system.—On the dolmens of Enfida, Central Tunisia, by M. Rouire. For the first time a systematic description is given of this remarkable group of dolmens, about 800 of which are found concentrated in a space of some 250 hectares, disposed without any apparent order, at distances of from 10 to 50 metres from each other. All belong to a perfectly uniform type, consisting of a long horizontal slab resting on upright stones joined at right angles. Except in a few depressions of the ground, none are covered with heaps of earth or stones so as to form true mounds or barrows, and all that were examined had the entrance on the east or south-east side. Like those of Constantine (Algeria), they are all of small size, the vertical stones scarcely exceeding 1 metre in height, and varying from 0·20 to 0·25 metre in thickness. In the few that were opened, little was found except some human bones and very coarse pottery, now deposited in the Ethnographic Museum.

BERLIN

Physiological Society, March 11.—Prof. Munk in the chair.—Dr. A. Baginski communicated the results of his observations and experiments respecting acetonuria in children. He found that acetone was present in small quantities in the urine of healthy children, though not in all; and that in the case of fever attending any of a very wide range of diseases, the quantity of acetone present in the urine was increased. When children were affected with eclampsia, attended, as such disease mostly was, by serious disorders in the digestion, a larger proportion of acetone was regularly observed in their urine. In regard to the formation of acetone in the blood, experiments in feeding, on different sorts of animals, showed that it was not produced by carbo-hydrates, as might be conjectured from the composition, $CH_3—CO—CH_3$, but from the decomposition of albumen. A longer course of flesh food yielded a very considerable increase in the secretion of acetone, whereas during a course of feeding with farinose and fatty foods, the yield of acetone very rapidly declined, and at length ceased altogether. When a large deposit of albumen occurred in the animal body, after the period of lactation for example, no acetone was found in the urine, even though food rich in albumen was administered. No causal connexion between acetonous urine and eclampsia could be demonstrated either clinically or experimentally. In rhachitis, in which eclamptic attacks often occurred, no acetone was found in the urine, nor was the administration of large quantities of acetone, even though continued for a considerable length of time, found to produce any effect on the nervous system.—Dr. Frenzel produced a long series of zoological and anatomical preparations preserved in accordance with his method. The preparations were hardened by means of alcohol containing sublimate, and injected with glycerine. The glycerine injection was effected first with a more diluted and then with a more concentrated solution, to which a solution of sugar was added as an ingredient. The relative proportion of glycerine and sugar was determined by the nature of the object.—Dr. Blaschko demonstrated, by drawings and very beautiful microscopic preparations, the structure of the epidermis. Starting with the assumption that the final endings of the nerves of feeling must be sought in the layer of the epidermis and not in the cutis, he had studied the structure of the upper skin at the boundary between epidermis and cutis. He distinguished the main parts of direct feeling (the hairless parts of the skin) from the parts of indirect feeling (the hairy parts of the skin). The former possessed on the under side of the epidermis very beautifully developed grooves (*Leisten*) forming a reticular system with spiral longitudinal and transverse lines. The hairy parts of the skin were influenced in their structure by the hairs, which likewise stood in spiral series, and had but very indistinct reticulations in the intermediate spaces.

Physical Society, March 4.—Prof. von Helmholtz in the chair.—Dr. Pringsheim reported on a further research into the chemical action of light on mixed hydrogen and chlorine gas (*Chlorknallgas*). This investigation respected the peculiar inductive action of light observed by Bunsen and Roscoe, during which the formation of hydrochloric acid was not effected, although the mixture of chlorine and hydrogen absorbed light, and at all events became changed, seeing the further influence of the like quantity of light at the end of the induction produced a chemical combination of the gases. In a former research (*vide* NATURE, vol. xxxiii. p. 287), Dr. Pringsheim showed that during the inductive action of the light an increase of volume in the gas mixture took place. If by means of electric sparks he illuminated the gas mixture in a glass globe above water, and shut off by a water index, then, on subjection to the first and each following spark up to the fourth, there occurred each time only an increase of volume which rapidly passed away; with the fifth and following sparks the effect was an increase of volume succeeded by a diminution; the latter a proof that hydrochloric acid was now formed and absorbed by the water. The speaker demonstrated at length that the assumption of a thermic influence as the cause of the increase of volume was excluded. On the contrary, he argued, there could here be a case only of chemical change in the gas mixture. It was probably an intermediate condition we had here to deal with, which of course refused explanation from the contemplation of the two gases Cl and H. Seeing that aqueous vapour was also present in the glass globe, the part it played in the reaction was now examined, and the fact was established that its presence was absolutely indispensable in effecting the chemical light effect. Dry chlorine and hydrogen did not unite into hydrochloric acid under the influence of the light; or the process was in such a case effected only very slowly. In all probability, therefore, the induction would have to be explained on the ground that intermediate products with larger volume were formed from the molecules ClCl, HH, and HHO, products whose chemical nature it had not yet been possible to determine.—Prof. Neesen made some supplementary communications respecting the tuning-forks filled with quicksilver, and stated that they had been constructed at an earlier date by Herr König.—Prof. von Bezold described a simple method of presenting complementary colours by means of prism, lens, and a special screen.—Prof. Vogel produced three fluids in three flat phials—one yellow and two blue fluids—which he made use of in demonstrations regarding colour-mixture in order to dispel the belief which prevailed very largely amongst the public that yellow and blue when mixed yielded only green. Phial 1 contained "acid yellow" (*Säuregelb*); phial 2, solution of ammoniacal copper; phial 3, aniline blue. 1 and 2 superimposed on each other gave green; 1 and 3 a fiery red.

Chemical Society, February 14.—Prof. H. Landolt in the chair.—F. Tiemann gave an account of Kiliani's research, according to which arabinose-carboxylic acid has the same composition as gluconic and galactonic acids. Arabinose is regarded as an aldehyde of normal pentahydroxypentane.—Amongst the other papers may be mentioned:—A contribution to our knowledge of secondary and tertiary quinones, by R. Nietzki and F. Kehrmann.—Tetramidobenzene and its derivatives, by R. Nietzki and E. Hagenbach.—Substitution of the amido-group in aromatic compounds, by the groups SH and SO_3H, the change being effected by means of a new diazo-reaction, by P. Klason.—The six toluenedisulphonic acids, by the same.—The constitution of pyrene and its derivatives, by E. Bamberger and M. Philip.—The action of chlorine on acet-α-naphthalide, by P. T. Cleve.

February 28.—A. W. Hofmann, President, in the chair.—G. Kraemer gave an account of the work done by himself in conjunction with W. Böttcher on the constituents of mineral naphtha. They have examined naphthas from Tegernsee, Pechelbronn, and Oelheim, and find they consist of a mixture of hydrocarbons which are not acted on by concentrated sulphuric or nitric acid, and of such as are dissolved by the acids with formation of sulphonates and nitro-derivatives; also small quantities of acids. The indifferent hydrocarbons are distinguished by their low specific gravity; they constitute the greater portion of the naphtha, and they consist partly of paraffins and partly of hydrocarbons isomeric with the olefines; these are called naphthenes. The authors consider the non-aromatic hydrocarbons which are soluble in acid to be derived from the naphthenes by condensation, in the same way as naphthalene, anthracene, &c., are derived from benzenes. The authors also discuss the question of the origin of mineral naphtha.—Amongst the other papers may be mentioned:—J. W. Brühl, on J. Thomsen's theory of the heat of formation of organic substances.—C. Gottig, on a new hydrate of soda.—Claisen and Lowman, on a new method of producing benzoylacetic ether.—A. Piutti, synthesis of trimesic ether.

BOOKS, PAMPHLETS, and SERIALS RECEIVED

Smithsonian Report, 1884, part 2 (Washington).—Supplement to Harmonies of Tones and Colours Developed by Evolution: F. J. Hughes (M. Ward and Co.).—Researches into the Etiology of Dengue (Chicago).—On the Influence of Fluctuations of Atmospheric Pressure on the Evolution of Fire Damp (Vienna).—On a Seismic Survey made in Tokio in 1884–85: J. Milne.—Über die Liasischen Cephalopoden des Hierlatz bei Hallstatt: G. Geyer (Fischer, Wien).—Mind, April (Williams and Norgate).—Jahrbuch der k.k. Geologischen Reichsanstalt, 36 Band, 4 Heft (Holder, Wien).

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